

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA16 | Ladbroke and Southam

Data appendix (LQ-001-016)

Land quality

November 2013

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Department
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Appendix LQ-001-016

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1 Introduction

1.1.1 The land quality appendices for the Ladbroke and Southam CFA comprise:

- a summary of engagement undertaken (Section 2);
- detailed risk assessment (Section 3);
- inspection notes and other site data (Section 4);
- geological SSSI and local geological sites (Section 5);
- mining and minerals data (Section 6); and

1.1.2 Maps referred to throughout the land quality appendix are contained in the Volume 5 land quality map book.

2 Engagement

- 2.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the environmental impact assessment for the Ladbroke and Southam area, the types of information that have been provided to the assessment team and any specific concerns of those engaged with.

Table 1: Engagement on land quality issues undertaken for the Ladbroke to Southam area

Local authority or other organisation	Information provided and/or specific concerns
Stratford-on-Avon District Council	Consulted for information on land contamination (via email 23 February 2013). The council confirmed that they had no further information on the areas identified as potentially posing a contaminative risk to the Proposed Scheme.
Warwickshire County Council	Meeting held on 13 March 2013. Information on mineral sites (i.e. Mineral Safeguarding Areas within the study area of the Proposed Scheme) received as paper copies in November 2012 and digitally on 12 April 2013.
Environment Agency	Consulted for information on landfills. No information obtained on Ufton Farm landfill located to the south-west of Southam.
Warwickshire County Council Petroleum Officer	Consulted for information on underground petroleum tanks. Information obtained on the vehicle breakdown recovery business, formerly a garage, off Banbury Road in Southam. The Petroleum Officer advised that no records were held on whether underground storage tanks were filled, removed, or remain in situ.

3 Detailed risk assessment

3.1.1 This appendix presents assessments for the higher risk potentially contaminated sites within the study area. For each site the following data is presented:

- baseline risk assessment;
- construction risk assessment;
- post-construction risk assessment; and
- assessment of temporary (construction) and permanent (post-construction) effects.

3.1.2 The sites assessed in this study area are set out in Table 2.

Table 2: Detailed risk assessment for areas assessed as potentially posing a contaminative risk for the Proposed Scheme.

Area ref	Area name
16-01	Sheep wash
16-20, 16-22 and 16-23	Infilled pits, ponds, and well
16-55	Former garage, now vehicle breakdown recovery business
16-56	Former garage, now Warwick House Industrial Park
16-57	Former works, depot, warehouse, now industrial estate
16-30	Infilled well
16-31	Infilled well
16-33	Former tank
16-39	Infilled well
16-53	Harp Farm
16-59	Fuel station

3.1.3 Contaminant types included within the risk assessments are based on the Priority Contaminants Report CLR 8.¹ Although this report has been withdrawn by the Environment Agency, there has been no subsequent authoritative document to replace it.

3.1.4 The remainder of this appendix presents the risk assessment for the sites set out in Table 2.

¹ DEFRA and Environment Agency (2002) CLR 8: Potential Contaminants for the Assessment of Land Contamination

Table 3: 16-01 Sheep wash baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Sheep wash Existing contaminants in the soils at the sheep wash, potentially including but not limited to metals, insecticides and fungicides	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
Main risk	Low risk				

Description

The sheep wash is located off an unnamed road at the south of the route section, within the area required for construction, approximately 20m to the west of the Proposed Scheme which will be constructed in cutting. A realistic and worst case assumption has been made, that chemicals such as insecticides and fungicides would have been washed into the ground and are present within soil. There are several ponds within 250m of the sheep wash, the closest of which is adjacent west to the site. There are no buildings within 250m however road infrastructure is located adjacent north to the sheep wash, and associated services are likely to be present, therefore property receptors have been included. The area required for construction in which the sheep wash is located will form part of the cutting earthworks which will involve disturbance of the ground and potential contamination which may be present. Superficial deposits are absent in this area, and the underlying bedrock is classified as unproductive strata.

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Table 4: 16-01 Sheep wash construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Sheep wash Existing contaminants in the soils at the sheep wash, potentially including but not limited to metals, insecticides and fungicides	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Likely	Minor	Moderate/low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
Main risk	Moderate/Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- due to the proximity of the ponds to the sheep wash the likelihood of run-off to surface waters will increase during construction;
- it is unlikely that remediation over and above the removal of contaminated material will be required; and
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice (CoCP).

Note

Construction workers have not been included in this assessment.

Table 5: 16-01 Sheep wash post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Sheep wash Existing contaminants in the soils at the sheep wash, potentially including but not limited to metals, insecticides and fungicides	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
Main risk	Very Low risk				

Note

It is assumed that identified contaminated material encountered will be removed during construction, as such it is anticipated no residual contamination will remain within the area required for construction. The sheep wash will no longer be present post-construction.

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Table 6: 16-01 Sheep wash significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in unproductive strata	Very low	Very low	Very low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Moderate/low	Very low	Minor adverse	Minor beneficial
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Moderate/low	Very low		
Overall significance				Negligible to minor adverse	Negligible to minor beneficial

Table 7: 16-20, 16-22 and 16-23 Infilled pits, ponds, and well baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled pits, ponds, and well Existing contaminants in the soils at these sources, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, ground-(landfill) gas and leachate	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - pond - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled ground is situated at Harp Farm to the south of Southam within the area required for construction where the Proposed Scheme will be constructed in cutting. A realistic and worst case scenario is assumed that the clay pit, ponds and well were manually infilled with waste and a full range of contaminants including leachate and ground- (landfill) gas are associated with the infilled ground. There is a pond situated adjacent to the sites and an unnamed stream is located approximately 210m south-west of the sites. There are on- and off-site residents and property receptors are situated adjacent to and up to 250m from the sites. There are no superficial deposits, and the underlying bedrock is classified as unproductive strata. In the location of the infilled clay pit there will be a construction traffic route and planting, and in the location of the infilled ponds, well and pit there will be soft landscaping associated with the Proposed Scheme.

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Table 8: 16-20, 16-22 and 16-23 Infilled pits, ponds, and well construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pits, ponds, and well Existing contaminants in the soils at these sources, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, ground-(landfill) gas and leachate	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - pond - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Likely	Minor	Moderate/low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- a ground investigation may be required prior to construction given that the infilled ground is within the area required for construction, and may be disturbed;
- it is unlikely that remediation over and above the removal of contaminated material will be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 9: 16-20, 16-22 and 16-23 Infilled pits, ponds, and well post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Post-construction with mitigation
Infilled pits, ponds, and well Existing contaminants in the soils at these sources, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, ground- (landfill) gas and leachate	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - pond - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Medium	Low
Main risk	Low risk				

Note

It is assumed that identified contaminated material encountered will be removed during construction, as such it is anticipated no residual contamination will remain within the area required for construction.

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Table 10: 16-20, 16-22 and 16-23 Infilled pits, ponds, and well significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of on-site human receptors (residents) by direct contact and ingestion of contaminated waters	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors (residents) to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in unproductive strata	Very low	Very low	Very low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Moderate/low	Very low	Minor adverse	Minor beneficial
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible to minor beneficial

Table 11: 16-55 Former garage, now vehicle breakdown recovery business baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former garage, currently a vehicle breakdown recovery business Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels, oils and other organic and inorganic contaminants	Current site users (commercial)	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

A former garage, currently a vehicle breakdown recovery business, is situated off Banbury Road to the south of Southam on the route, which will be constructed in cutting. There is a residential property adjacent to the site and a pond is situated approximately 220m south of the site. Superficial deposits are not present, and the underlying bedrock is classified as unproductive strata. The vehicle breakdown recovery business and adjacent properties will be demolished as part of the Proposed Scheme. Information received from the Warwickshire County Council Petroleum Officer indicates that there were below-ground storage tanks associated with operation of the garage but no records are held on whether the tanks have been filled, removed, or remain in situ. A realistic and worst case scenario is assumed that the tanks leaked and petroleum hydrocarbons are present in soils at the site.

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Table 12: 16-55 Former garage, now vehicle breakdown recovery business construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Construction with mitigation
Former garage, currently a vehicle breakdown recovery business Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels, oils and other organic and inorganic contaminants	Current site users (commercial)	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Not present during construction		
		Direct contact and ingestion of contaminants in contaminated waters	Not present during construction		
		Inhalation of volatile vapours from contaminated soil/water	Not present during construction		
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- a ground investigation is likely to be undertaken as the former garage is situated along the route and should contaminated material/water be encountered it will be remediated or removed.
- it is unlikely that remediation over and above the removal of contaminated material will be required.
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 13: 16-55 Former garage, now vehicle breakdown recovery business post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Post-construction with mitigation
Former garage, currently a vehicle breakdown recovery business Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels, oils and other organic and inorganic contaminants	Current site users (commercial)	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Not present during construction		
		Direct contact and ingestion of contaminants in contaminated waters	Not present during construction		
		Inhalation of volatile vapours from contaminated soil/water	Not present during construction		
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in unproductive strata	Unlikely	Negligible	Very low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
Main risk	Very Low risk				

Note

It is assumed that identified contaminated material encountered will be removed during construction, as such it is anticipated that no residual contamination will remain within the area required for construction. The former garage, currently a vehicle breakdown recovery business, will be demolished during construction.

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Table 14: 16-55 Former garage, now vehicle breakdown recovery business significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	n/a	n/a	n/a	n/a
Exposure of on-site human receptors (commercial) by direct contact and ingestion of contaminated waters	Very low	n/a	n/a	n/a	n/a
Exposure of on-site human receptors (commercial) to contamination by inhalation of volatile vapours from contaminated soil/water	Low	n/a	n/a	n/a	n/a
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in unproductive strata	Very low	Very low	Very low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Low	Very low		
Overall significance				Negligible	Negligible to minor beneficial

Table 15: 16-56 Former garage, now Warwick House Industrial Park baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former garage with potential tanks, currently Warwick House Industrial Park Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels, oils and other organic and inorganic contaminants	On-site commercial users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site users of commercial properties and sports grounds	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

A former garage, currently Warwick House Industrial Park, is situated off Banbury Road on the southern outskirts of Southam 10m to the north east of the area required for construction and approximately 430m to the north east of the route which will be constructed on embankment. The area required for construction in this location relates to the realignment of Banbury Road. A football ground and a playing field are located across the road from the industrial park and there is a sports pavilion and other commercial properties located within 250m of the former garage, outside of the area required for construction. There are several ponds within 250m of the site, the nearest of which is approximately 145m south west of the site. Superficial deposits are absent and the underlying bedrock is classified as a Secondary A aquifer. A realistic and worst case scenario is assumed, that contamination resulting from industrial activities has migrated into the area required for construction and is present in soil and groundwater.

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Table 16: 16-56 Former garage, now Warwick House Industrial Park construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Construction with mitigation
Former garage with potential tanks, currently Warwick House Industrial Park Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels, oils and other organic and inorganic contaminants	On-site commercial users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties and sports grounds	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- although the industrial park will not be disturbed during construction, contamination may have migrated into the area required for construction and may be disturbed during the road realignment;
- it is unlikely that remediation over and above the removal of contaminated material will be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 17: 16-30 16-56 Former garage, now Warwick House Industrial Park post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Post-construction with mitigation
Former garage with potential tanks, currently Warwick House Industrial Park Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels, oils and other organic and inorganic contaminants	On-site commercial users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties and sports grounds	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

Any contaminated material encountered within the area of land required to construct the Proposed Scheme will be removed, but the industrial park will remain post-construction and therefore risks are considered to remain the same as at baseline.

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Table 18: 16-56 Former garage, now Warwick House Industrial Park significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 19: 16-57 Former works, depot, warehouse, now industrial estate baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Works, depot, warehouse with former tanks and electricity substations; now Kinton Road industrial estate Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants including heavy metals, fuel and oil.	Off-site users of commercial properties and residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

A shoe factory was present in the north of the current Kinton Road industrial estate in 1955, and by the 1970s several works, a warehouse and a depot with associated tanks had been established. The former facilities are approximately 70m from the area required for construction and the current industrial estate is adjacent to the area of land required for construction, the closest part of which will be used for planting and highway realignment. The industrial estate is 160m from the Proposed Scheme, which will be constructed in cutting. There is one pond on the industrial estate, and several ponds within 250m. There are residential properties both adjacent to the north of the industrial estate, and 200m from the site, adjacent to the area required for construction. Superficial deposits are absent but the underlying bedrock is classified as a Secondary A aquifer.

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Table 20: 16-57 Former works, depot, warehouse, now industrial estate construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Works, depot, warehouse with former tanks and electricity substations; now Kineton Road industrial estate Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants including heavy metals, fuel and oil.	Off-site users of commercial properties and residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- although the former works, now industrial estate, will not be disturbed during construction, migration of contamination into the area required for construction may have occurred.
- it is unlikely that remediation over and above the removal of contaminated material will be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 21: 16-57 Former works, depot, warehouse, now industrial estate post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Post-construction with mitigation
Works, depot, warehouse with former tanks and electricity substations; now Kineton Road industrial estate Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants including heavy metals, fuel and oil.	Off-site users of commercial properties and residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

It is assumed that any contaminated material encountered in the area required for construction will be removed; however the industrial estate will remain post-construction so the risks are considered to remain the same as at baseline.

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Table 22: 16-57 Former works, depot, warehouse, now industrial estate significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 23: 16-30 Infilled well baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled well Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site occupants/users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

An infilled well is situated at Field Cottage to the south of Southam, 10m from the western area required for construction and 65m from the route of the Proposed Scheme which will be constructed in cutting. A realistic and worst case scenario is assumed that the well was manually infilled with waste and a range of contaminants including leachate and ground- (landfill) gas are present; however identified contamination is considered likely to be minimal. There are human receptors at Field Cottage, and off-site human receptors comprise occupants of residential and commercial properties. Southam Rugby Club is located approximately 150m from the infilled well. The nearest surface water within 250m is a pond located within the area required for construction. Superficial deposits are not present and underlying bedrock is classified as a Secondary A aquifer.

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Table 24: 16-30 Infilled well construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site occupants/users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- although the infilled well should not be disturbed during construction because it is outside of the area required for construction, migration may have occurred and should contaminated material/water be encountered it will remediated or removed;
- it is unlikely that remediation over and above the removal of contaminated material will be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 25: 16-30 Infilled well post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site occupants/users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock Aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock Aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

It is assumed that identified contaminated material encountered within the area required for construction will have been removed; however, the infilled well (located outside the area required for construction) will remain so the risks are considered to remain the same as at baseline.

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Table 26: 16-30 Infilled well significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 27: 16-31 Infilled well baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled well Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

An infilled well is situated at The Old Coach House to the south of Southam, 50m from the area required for construction and approximately 150m to the south of the route, which will be constructed in cutting. The area required for construction closest to the infilled well will be used for planting. A pragmatic and worst case scenario is assumed that the well was manually infilled with waste and a full range of contaminants including leachate and ground- (landfill) gas are associated with the infilled ground. There are both residential and commercial property receptors within 250m of the site, and Southam Rugby and Football club is situated 150m south of the site. There are no surface waters within 250m of the site. Superficial deposits are absent, and underlying bedrock is classified as a Secondary A aquifer.

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Table 28: 16-31 Infilled well construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifers	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- although the infilled well will not be disturbed during construction there may have been some migration of contamination into the area required for construction. But given the unintrusive nature of the works in this area (planting) the risks are considered to remain the same as at baseline.
- it is unlikely that remediation over and above the removal of contaminated material will be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 29: 16-31 Infilled well post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

It is unlikely that contamination from the infilled well will have been encountered in the area required for construction so risks are considered to remain the same as at baseline.

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Table 30: 16-31 Infilled well significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A aquifer	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 31: 16-33 Former tank baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former tank Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuel and oil.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
Main risk	Low risk				

Description

A former tank is situated at The Old Coach House to the south of Southam, 90m from the area required for construction and 160m from the Proposed Scheme which will be constructed in cutting. The area of land required for construction closest to the tank will be used for planting and for temporary stockpiling, and intrusive construction works will take place over 100m away from the former tank. A realistic and worst case scenario is assumed that the tank was used to store fuels or oils and has leaked and residual contamination is present in soil and groundwater. There are both residential and commercial property receptors within 250m of the site, and Southam Rugby and Football club is situated 150m south of the site. There are no surface waters within 250m of the site. Superficial deposits are absent, and underlying bedrock is classified as a Secondary A aquifer.

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Table 32: 16-33 Former tank construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Former tank Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuel and oil.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- construction work will take place over 100m from the former tank and it is considered unlikely that contamination will have migrated over such a distance. Therefore the risks are considered to remain the same as at baseline.
- it is unlikely that remediation over and above the removal of contaminated material, if encountered, would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 33: 16-33 Former tank post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Former tank Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuel and oil.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
Main risk	Low risk				

Note

It is assumed that any contaminated material encountered in the area required for construction will be removed, however the former tank lies outside of this area so will remain undisturbed and the risks are therefore considered to remain the same as at baseline.

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Table 34: 16-33 Former tank significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A aquifer	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 35: 16-39 Infilled well baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled well Existing contaminants in the soils and groundwater at the well, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary (undifferentiated) aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) aquifer	Low likelihood	Minor	Low
	Controlled waters -unnamed surface watercourse	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

An infilled well is situated to the east of Lower Farm within the area required for construction and 60m from the route which will be constructed in cutting. A realistic and worst case scenario is assumed that the well was manually infilled with waste and a full range of contaminants including leachate and ground- (landfill) gas are associated with the infilled ground. There are off-site residential and commercial property receptors within 250m at Lower Farm. The River Itchen is located 220m to the south-east of the site. There are no superficial deposits underlying the site but the underlying bedrock is classified as a Secondary (undifferentiated) aquifer.

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Table 36: 16-39 Infilled well construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the well, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary (undifferentiated) aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) aquifer	Low likelihood	Minor	Low
	Controlled waters - unnamed surface watercourse	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- a ground investigation is unlikely to be required as only low levels of potential contamination are expected from the infilled well. The area of the infilled well will be used for planting and a highway realignment so identified contamination present will be removed from the area required for construction;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 37: 16-39 Infilled well post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the well, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground- (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Secondary (undifferentiated) aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) aquifer	Unlikely	Minor	Very low
	Controlled waters -unnamed surface watercourse	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

It is assumed that identified contaminated material encountered in the area required for construction will be removed, as such it is not anticipated residual contamination would remain.

Table 38: 16-39 Infilled well significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary (undifferentiated) aquifer	Low	Low	Very low	Negligible	Minor beneficial
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible to minor beneficial

Table 39: 16-53 Harp Farm baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Harp Farm Fuels, oils, pesticides, fertilisers and a full range of other organic and inorganic contaminants	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in unproductive strata.	Unlikely	Negligible	Very low
	Controlled waters - pond and unnamed stream	Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

Harp Farm lies on the route of the Proposed Scheme which will be constructed in cutting. The farmstead buildings will be demolished as part of the construction phase to facilitate the cutting earthworks. Potential contaminants associated with the farm includes pesticides/chemicals, oils and fuels. There are residential properties adjacent to and within 250m of the premises. There is a pond on the premises and another within 250m. There are no superficial deposits and the underlying bedrock is classified as unproductive strata.

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Table 40: 16-53 Harp Farm Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction without mitigation
Harp Farm Fuels, oils, pesticides, fertilisers and a full range of other organic and inorganic contaminants	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in unproductive strata.	Low likelihood	Negligible	Very low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- a ground investigation may be required prior to construction as the site lies on the route of the Proposed Scheme;
- it is unlikely that remediation over and above the removal of contaminated material, if encountered, will be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment. It is understood that on-site farmstead buildings will be demolished. There may be an increased potential for leaching of contaminants to groundwater during construction.

Table 41: 16-53 Harp Farm post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Post-construction without mitigation
Harp Farm Fuels, oils, pesticides, fertilisers and a full range of other organic and inorganic contaminants	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - unproductive strata	Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in unproductive strata.	Unlikely	Negligible	Very low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
Main risk	Very Low risk				

Note

The farmstead buildings will have been demolished and identified contamination encountered will have been removed.

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Table 42: 16-53 Harp Farm significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in unproductive strata	Very low	Very low	Very low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Very low	Negligible	Minor beneficial
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Very low	Negligible	Minor beneficial
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Low	Very low		
Overall significance				Negligible	Negligible to minor beneficial

Table 43: 16-59 Fuel station baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Fuel station Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels and oils	Off-site human receptors	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

A fuel station is located at a Tesco supermarket on the southern outskirts of Southam, between Kineton Road industrial estate and Holywell Business Park. It is situated 165m to the east of the area required for construction and 275m from the route of the Proposed Scheme which will be constructed in cutting. It is understood to be a relatively new fuel station, however for this assessment a realistic and worst case assumption has been made that underground fuel storage tanks at the fuel station have leaked and contamination is present within soils and groundwater. There are no on-site human receptors but there are off-site human receptors in residential properties within 180m of the site, and in commercial properties within 25 m. There is a pond within 220m of the site. Superficial deposits are absent, but groundwater within the bedrock underlying the site is classified as a Secondary A aquifer. The area of land take closest to the fuel station would be used for planting associated with the Proposed Scheme.

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Table 44: 16-59 Fuel station construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Fuel station Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels and oils	Off-site human receptors	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- intrusive construction work will take place over 250m from the fuel station and it is considered unlikely that contamination would have migrated over such a distance into the area required for construction. Ground investigation is not considered likely to be required prior to construction;
- it is unlikely that remediation over and above the removal of contaminated material, if encountered, will be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 45: 16-59 Fuel station post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Fuel station Existing contaminants in the soils and groundwater at the source, potentially including but not limited to fuels and oils	Off-site human receptors	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

The fuel station will remain post-construction so the risks are considered to remain the same as at baseline.

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Table 46: 16-59 Fuel station significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

4 **Inspection notes and other site data**

- 4.1.1 There were no sites identified as priority for inspection in the Ladbroke and Southam study area.

5 Geological SSSI and local geological sites

5.1.1 This appendix presents the following data:

- citation data for geological sites of special scientific interest (SSSI);
- citation data for local geological sites (LGS), formerly called regionally important geological sites (RIGS); and
- any other relevant site data.

5.1.2 No geological SSSI or local geological sites are present in the Ladbroke and Southam study area.

6 Mining and minerals data

- 6.1.1 This appendix presents the following data relating to mining and minerals information:
- details of planning data for minerals sites;
 - lists of marl pits in each study area; and
 - data from The Coal Authority.
- 6.1.2 There are no relevant mining sites or additional relevant mineral data for the Ladbroke and Southam study area.